REMARKS

By the present amendment and response, independent claims 18, 25, and 36 and dependent claims 26 and 43 have been amended to overcome the Examiner's objections. Claims 18-45 are pending in the present application. Reconsideration and allowance of pending claims 18-45 in view of the following remarks are requested.

The Examiner has rejected claims 26 and 43 under 35 USC §112, second paragraph. Applicant has amended claims 26 and 43 in response to the Examiner's objection and submits that the requirements of 35 USC §112, second paragraph, have been met.

The Examiner has rejected claims 18-45 under 35 USC §103(a) as being unpatentable over "admitted prior art." For the reasons discussed below, Applicant respectfully traverses this rejection. The present invention, as defined by amended independent claims 18 and 36, teaches, among other things, a base comprising kinetically controlled growth mode single crystal silicon-germanium and a base contact comprising mass controlled growth mode polycrystalline silicon-germanium, where both the base and base contact are grown at a first pressure and a first temperature. As disclosed in the present application, in a kinetically controlled growth mode, the growth rate is primarily dependent on temperature and relatively insensitive to the pressure and the precursor gas flow rate, while in a mass controlled growth rate, the growth rate is primarily dependent on the amount of precursor gas and the precursor gas pressure and relatively insensitive to temperature. As disclosed in the present application, a base contact can comprise

polycrystalline silicon-germanium grown in the mass controlled growth mode, i.e. mass controlled growth mode polycrystalline silicon-germanium, and a base can comprise single crystal silicon-germanium grown in the kinetically controlled growth mode, i.e. kinetically controlled growth mode single crystal silicon-germanium. As a result, at lower temperatures, such as 650° C, the present invention achieves growth of polycrystalline silicon-germanium base contact without causing a substantial growth in the single crystal silicon-germanium base.

Additionally, for precursor gas flow rates in an appropriate range, such as between approximately 100.0 SCCM (standard cubic centimeters) and approximately 400.0 SCCM, the epitaxial growth rates for the single crystal silicon-germanium are not significantly affected, while the polycrystalline growth rates vary almost linearly as a function of the precursor gas flow volume. Thus, the present invention achieves control over the ratio of polycrystalline silicon-germanium base contact deposition rate to single crystal silicon-germanium base deposition rate. As a result, the present invention achieves control over the thickness of the deposition and also the structure in terms of how much of the deposition is polycrystalline and how much is amorphous or unstructured deposition. Thus, the present invention can advantageously achieve lower base contact resistance by increasing the thickness of the polycrystalline silicon-germanium and also advantageously improve the crystal structure of the base by increasing the proportion of polycrystalline material over amorphous.

The Examiner cites pages 2-5 of the present application to disclose a heterojunction bipolar transistor having a single crystal silicon-germanium base and a polycrystalline base contact. However, pages 2-5 of the present application does not teach, disclose, or suggest a base comprising kinetically controlled growth mode single crystal silicon-germanium and a base contact comprising mass controlled growth mode polycrystalline silicon-germanium, as specified in amended independent claim 1. In fact, pages 2-5 of the present application cited by the Examiner do not even mention a kinetically controlled growth mode or a mass controlled growth mode. Thus, in contrast to the claimed and disclosed invention, pages 2-5 of the present application, do not teach, disclose, or suggest a base comprising kinetically controlled growth mode single crystal silicon-germanium and a base contact comprising mass controlled growth mode polycrystalline silicon-germanium, where both the base and base contact are grown at a first pressure and a first temperature.

For the foregoing reasons, Applicant respectfully submits that amended independent claims 18 and 36 and claims 19-24 depending from amended independent claim 18 and claims 37-45 depending from amended independent claim 36 traverse the Examiner's rejection, and are all in condition for allowance.

The present invention, as defined by amended independent claim 25, teaches, among other things, a single crystal region comprising kinetically controlled growth mode single crystal silicon and a polycrystalline region comprising mass controlled growth mode polycrystalline silicon, where both the single crystal region and the polycrystalline

region are grown at a first pressure and a first temperature. The present invention, as defined by amended independent claim 25, provides similar advantageous as the present invention as defined by amended independent claims 18 and 36 discussed above. Thus, for similar reasons, Applicant respectfully submits that the present invention, as defined by amended independent claim 25, is patentable. Thus, amended independent claim 25 and claims 26-35 depending from amended independent claim 25 are, *a fortiori*, also patentable for at least the reasons presented above and also for additional limitations contained in each dependent claim.

Based on the foregoing reasons, the present invention, as defined by amended independent claims 18, 25, and 36 and claims depending therefrom, is patentable. As such, and for all the foregoing reasons, an early allowance of claims 18-45 pending in the present application is respectfully requested.

Respectfully Submitted,
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Date: 2/2/04

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